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1		Federal Transit Administration
2		Noise Impact Assessment Spreadsheet
3		Copyright 2007 HMMH Inc.
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7		DESCRIPTION OF THE FTA NOISE IMPACT ASSESSMENT SPREADSHEET
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9		This spreadsheet enables the user to predict noise levels from transit sources and evaluate the level of impact on noise-sensitive receivers. It incorporates the procedures for a General Noise Assessment contained in Chapter 5 of the Federal Transit Administration's guidance manual, "Transit Noise and Vibration Impact Assessment." The FTA guidance describes situations where a General Noise Assessment is appropriate. In situations where Detailed Noise Analysis is needed (e.g., for new fixed-guideway projects in preliminary engineering), this spreadsheet should not be used; instead, the procedures in Chapter 6 of the guidance should be followed.
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11		The main spreadsheet is divided into three sections: Receiver Parameters, Noise Source Parameters, and Project Results. The sections below give directions on how the user provides the relevant inputs to the model to obtain project noise levels and an assessment of impact on selected receivers. The default spreadsheet is set up to model the transit scenario in Example 5-1, Part 1 in the guidance manual. The user is encouraged to use the spreadsheet to complete the other examples in Chapter 5 to understand how the spreadsheet works. References to the FTA guidance are made below where elaboration is needed.
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13		Receiver Parameters:
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15		A "receiver" is a noise-sensitive site. The user begins by entering information about the receiver in the green-shaded cells. The Receiver cell is for the user's own reference and can be any identifier.
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17		Land Use Category: With respect to each receiver, the user must first select the appropriate land-use category from three choices provided in a drop-down list. The choice of land-use category determines the specific noise descriptor and impact criteria that will be used in the spreadsheet calculations. FTA's noise impact criteria are based on Ldn for Category 2 land uses and one-hour Leq for the noisiest hour of transit-related activity for Category 1 and 3 land uses (see Table 3-2 in the guidance).
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19		<p>Existing Noise: The user must enter the existing noise level at the receiver. The validity of the noise impact assessment depends heavily on an accurate estimate of existing noise. Full or partial measurements are always preferred. Depending on the land-use category selected, the user enters the measured existing noise level (Ldn or Leq(h)) in the cell, Existing Noise (Measured or Generic Value). For situations where actual measurements cannot be obtained, the user should apply the appropriate noise levels from Table 5-7 in the guidance manual. The generic noise environments in Fig. 2-17 could be used but only if the impact assessment is in terms of Ldn. Further information on determining existing noise levels – including a discussion of the methods considered most accurate -- is found in Appendix D in the manual.</p>
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21		Noise Source Parameters:
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23		The user enters information about the noise source or sources in the blue-shaded cells.
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25		<p>Number of Noise Sources: First, the number of noise sources to be analyzed for a given receiver must be entered. From the drop-down list, the user can specify up to six separate sources. The spreadsheet will then calculate a combined noise level (Ldn or Leq(h) depending on receiver land use) from all noise sources at the receiver. For instance, when determining noise impact at a receiver located near a commuter rail track, two sources can be selected to calculate noise levels from a train which is made up of a diesel-electric locomotive and rail cars. Multiple sources can also be used to determine combined noise from a complex situation, such as a light rail transit station where the model can calculate the total noise from LRT trains, grade-crossing bells, and park-and-ride activity.</p>
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27		<p>Noise Source Parameters: The number of noise sources specified by the user determines the number of Noise Source Parameters boxes displayed by the spreadsheet for which project data must be entered. For each box, the user must first specify a Source Type, either Fixed Guideway, Highway/Transit, or Stationary Source. Selecting a source type leads to a drop-down list in the cell below from which the user chooses a specific source. For example, selecting Fixed Guideway leads to a list of specific sources including diesel-electric locomotives, DMUs, etc.</p>
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29		<p>Specific Source: Depending on the specific source selected, the subsequent cells in the box ask the user to provide operating information for the project, such as frequency of operations, duration of individual events, average speed, etc. The specific operating information needed depends on the source and also the land-use category that was selected under Receiver Parameters. If land-use category 2 was selected, operating data for daytime (7 am-10 pm) and nighttime (10 pm-7 am) hours must be provided. If category 1 or 3 was selected, operating data for the busiest transit hour during the time of use of the noise-sensitive facility must be provided. Parameters for all land-use categories are based on hourly or average hourly traffic, and number of locomotives/rail cars/rail transit vehicles in a given consist. The specific parameters will change based on the specific source. Refer to tables 5-2, 5-4, and 5-6 for further definition of the parameters and options.</p>
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31		<p><u>Please note:</u> After the operating data are entered in the cells for a specific source, if the user should subsequently change the specific source, the previously entered operating data will not be wiped out. The user must enter the new operating data for the new source over the old data in the cells.</p>
32		
33		<p>Distance: The distance from the source to the receiver must be specified. If more than one source is being analyzed, the distances between the sources and the receiver may be different. In the case of a commuter train, however, the distance between the two sources (locomotive and rail cars) and the receiver would be the same.</p>
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35		Adjustments: Various adjustments are available depending on the specific source chosen above:
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37		<p>Noise Barrier: This allows the user to approximate the benefits of installing a noise barrier. If "Yes" is selected from the drop-down list, the noise level for the source is reduced by 5 dB for Rail Transit Vehicles, Rail Cars, Highway/Transit sources, and Stationary sources. This is appropriate only if the following conditions are met: the noise barrier needs to be high enough to completely block the line-of-sight between the noise source and the receiver; the barrier must be free of any gaps or openings; and the barrier should be constructed out of an outdoor weather-resistant material such as wood or concrete. If these conditions are not met, the effectiveness of the barrier will be overestimated. If the user is not sure these conditions can be met, then "No" should be chosen. Refer to Section 6.8.3 in the guidance for more information.</p>
38		
39		<p>Jointed Track/Embedded Track/Aerial Structure: These adjustments are for Rail Transit Vehicles and Rail Cars only. If "Yes" is selected from the drop-down list for any of these sources, the noise level of the source is increased based on the values given in Table 5-2.</p>
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42		Project Results:
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44		Results are given in the red boxes to the right of Receiver Parameters and Noise Source Parameters. In addition to a summary box, separate boxes below display the noise prediction results for each source analyzed.
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46		Project Results Summary: This box shows the total project noise level at the receiver (Ldn or Leq(h)) which is the combined noise level from all the sources analyzed. The Total Noise Exposure shows the new cumulative noise level when project noise is added to the existing noise level. The Increase shows the difference between the existing and the new cumulative noise environments. This box also predicts the level of impact ("None," "Moderate," or "Severe") based on FTA's noise impact criteria (refer to Fig. 3-1 in the guidance manual).
47		
48		Distance to Impact Contours: In certain cases the spreadsheet will indicate the distances from the noise source to the points at which moderate impact and severe impact occur. This can only be done when one or two sources are being analyzed. With two sources, both must be the same source type and the same distance from the receiver, for example, a commuter train with a locomotive and rail cars. Example 5-1, Part 1 in the guidance manual is such a case. Distance to impact contours will not be shown for more complex cases.
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50		Impact Plots:
51		
52		Noise Impact Criteria: The level of impact is determined based on the combined noise level from all sources at the receiver and the existing noise level at the receiver. The level of impact is plotted against the noise impact criteria curves from Figure 3-1 in the guidance. This is displayed in the Calculations tab as well as the Impact Plots tab. The Moderate and Severe impact criteria curves are based on the land-use category chosen in the Receiver Parameters box. Therefore, the impact criteria curves and the y-axis (Project Noise Level) label will conform automatically to the land-use category selected.
53		
54		Increase in Cumulative Noise Levels Allowed: In certain cases, the cumulative form of the noise impact criteria should be used. In general, these situations occur when the existing noise environment already has transit noise in it and the existing noise sources may change as a result of the project. This plot from Figure 3-2 in the guidance presents noise impact in terms of the increase in cumulative noise levels due to the project. See sections 3.1.2 and 3.2.3 for further discussion on when this form of the criteria should be used. In both plots, the Project Noise Level/Increase in Cumulative Noise Level values are shown next to the marker.
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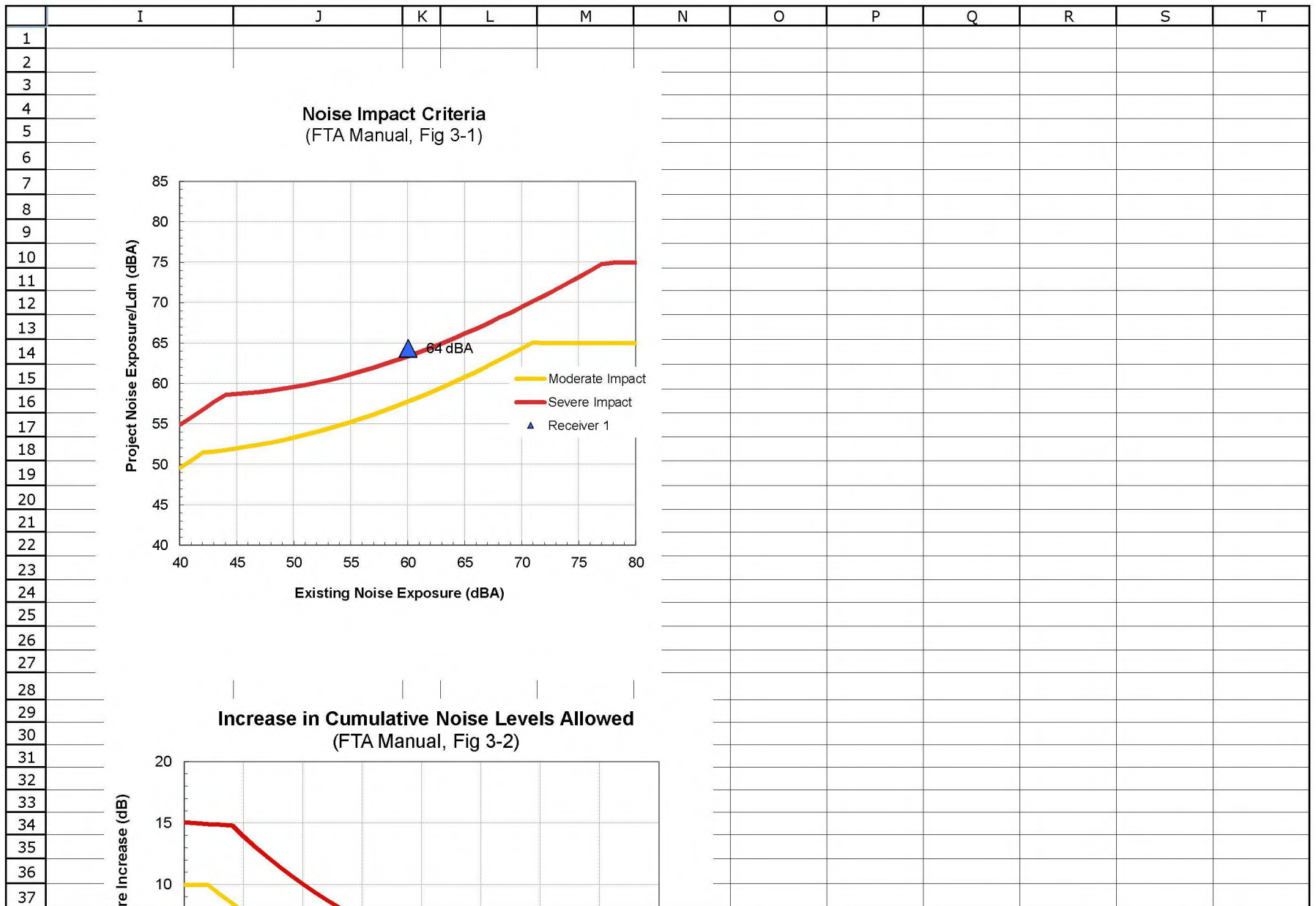
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57	Report:	
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59	The report page tabulates the noise levels for each source as well as the total combined noise level for all sources.	
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61		• First two columns list the sources and their distances from the receiver.
62		• Third column shows the noise from each source.
63		• Fourth column has the existing noise level at the receiver.
64		• Fifth and sixth columns give the noise impact criterion levels, Moderate and Severe, that relate to the existing ambient noise level in the fourth column.
65		• Seventh column gives the noise impact rating for each source. (This information may be useful in identifying which source is dominant in causing impact.)
66		• Bottom row of the table shows the cumulative noise effect of all sources and the resulting overall impact at the receiver.
67		
68	This table can be copied and pasted into a word-processing or spreadsheet document to perform additional calculations or to present results for publication.	
69		
70	Finally, the steps outlined above would be repeated for each individual receiver and receiver representing a cluster of noise-sensitive sites that may be affected by the project. The boundaries for the noise impact assessment can be established by using the screening procedure in Chapter 4 of the guidance.	

	A	B	C	D	E	F	G	H
1		Federal Transit Administration						
2		Noise Impact Assessment Spreadsheet						
3		Copyright 2007 HMMH Inc.						
4		June 8, 2007						
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6		Project: FTA Example 5-1, Part 1						
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10		Receiver Parameters						
11			Receiver:	Receiver 1				
12			Land Use Category:	2. Residential				
13		Existing Noise (Measured or Generic Value):		60 dBA				
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17		Noise Source Parameters						
18		Number of Noise Sources:		4				
19								
20		Noise Source Parameters		Source 1				
21			Source Type:	Fixed Guideway				
22			Specific Source:	Diesel Electric Locomotive				
23		Daytime hrs	Avg. Number of Locos/train	1				
24			Speed (mph)	40				
25			Avg. Number of Events/hr	2.8				
26								
27		Nighttime hrs	Avg. Number of Locos/train	1				
28			Speed (mph)	40				
29			Avg. Number of Events/hr	0.7				
30								
31		Distance	From Source to Receiver (ft)	50				
32		Adjustments						
33								
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37		Noise Source Parameters		Source 2				

Project Results Summary	
Existing Ldn:	60 dBA
Total Project Ldn:	64 dBA
Total Noise Exposure:	66 dBA
Increase:	6 dB
Impact?:	Severe

Distance to Impact Contours	
Dist to Mod. Impact Contour:	---
Dist to Sev. Impact Contour:	---

Source 1 Results	
Leq(day):	61.8 dBA
Leq(night):	55.8 dBA
Ldn:	63.8 dBA



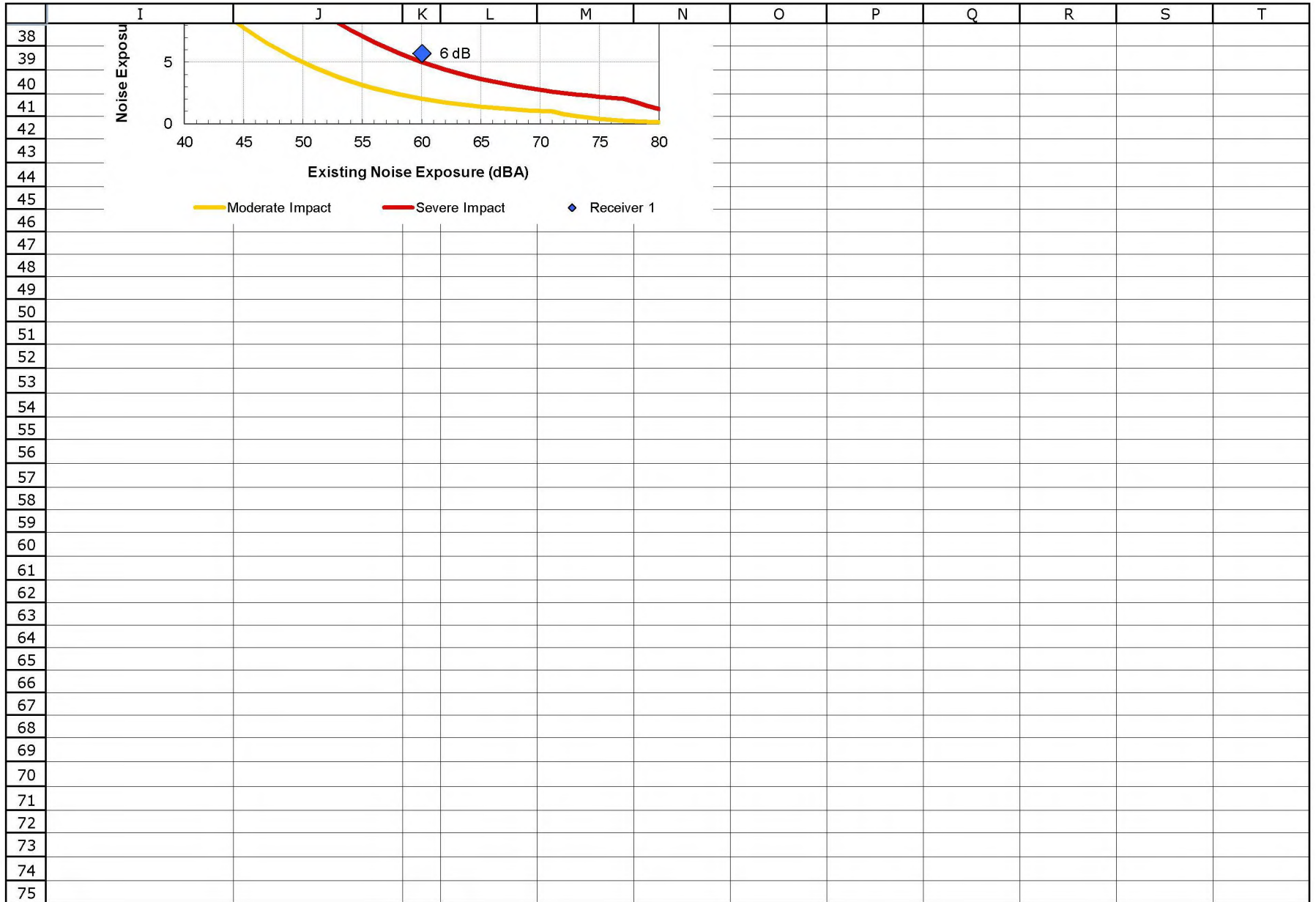
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38			Source Type:	Fixed Guideway				
39			Specific Source:	Rail Car			Source 2 Results	
40	Daytime hrs	Avg. Number of Rail Cars/train	3				Leq(day):	53.7 dBA
41		Speed (mph)	40				Leq(night):	47.7 dBA
42		Avg. Number of Events/hr	2.8				Ldn:	55.6 dBA
43							Incremental Ldn (Src 1-2):	64.4 dBA
44	Nighttime hrs	Avg. Number of Rail Cars/train	3					
45		Speed (mph)	40					
46		Avg. Number of Events/hr	0.7					
47								
48	Distance	From Source to Receiver (ft)	50					
49	Adjustments	Noise Barrier?	No					
50		Jointed Track?	No					
51		Embedded Track?	No					
52		Aerial Structure?	No					
53								
54	Noise Source Parameters			Source 3				
55		Source Type:	Stationary Source					
56		Specific Source:	Layover Tracks (commuter rail)				Source 3 Results	
57	Daytime hrs	Avg. Number of Trains/hr					Leq(day):	0.0 dBA
58							Leq(night):	0.0 dBA
59							Ldn:	6.4 dBA
60							Incremental Ldn (Src 1-3):	64.4 dBA
61	Nighttime hrs	Avg. Number of Trains/hr						
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65	Distance	From Source to Receiver (ft)						
66	Adjustments	Noise Barrier?	No					
67								
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71	Noise Source Parameters			Source 4				
72		Source Type:	Fixed Guideway					
73		Specific Source:	Diesel Electric Locomotive				Source 4 Results	
74	Daytime hrs	Avg. Number of Locos/train					Leq(day):	0.0 dBA
75		Speed (mph)					Leq(night):	0.0 dBA



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76			Avg. Number of Events/hr					Ldn: 6.4 dBA
77								Incremental Ldn (Src 1-4): 64.4 dBA
78	Nighttime hrs		Avg. Number of Locos/train					
79			Speed (mph)					
80			Avg. Number of Events/hr					
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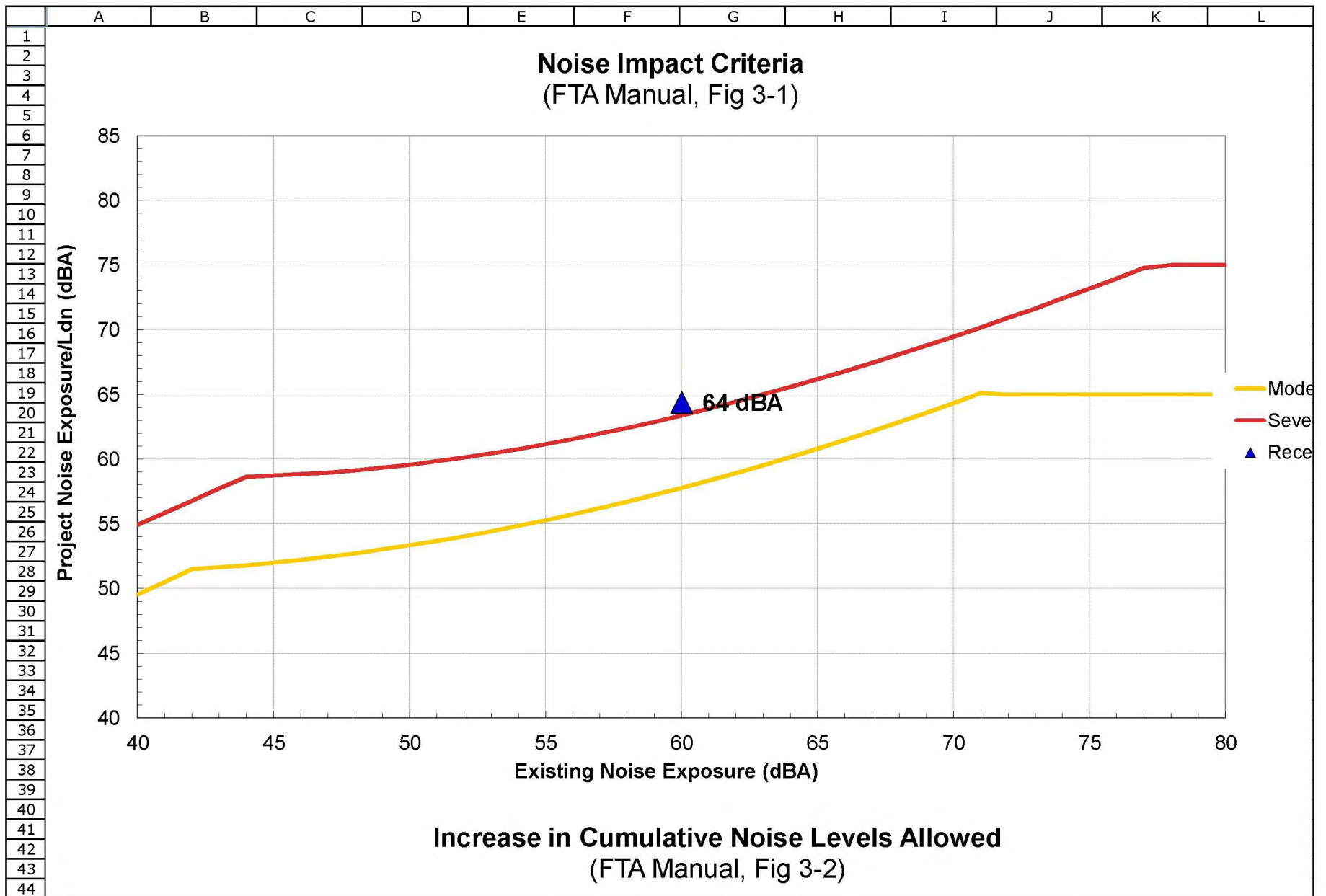
Cell: D100
Comment:

Cell: D106
Comment:

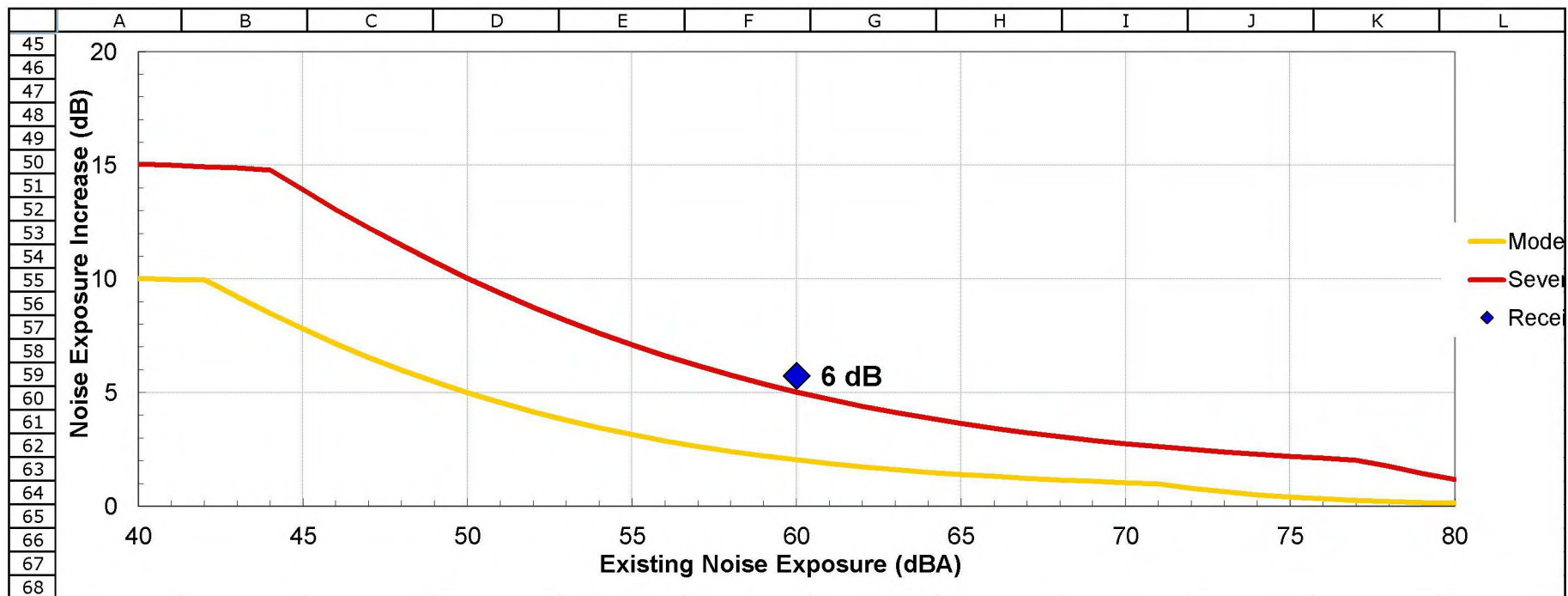
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7			Project:	FTA Example 5-1, Part 1					
8			Receiver:	Receiver 1					
9									
10							Noise Criteria		
11			Source	Distance	Project Ldn	Existing Ldn	Mod. Impact	Sev. Impact	Impact?
12			1 Diesel Electric Locomotive	50 ft	63.8 dBA	60 dBA	58 dBA	63 dBA	Severe Impact
13			2 Rail Car	50 ft	55.6 dBA	60 dBA	58 dBA	63 dBA	None
14			3 Layover Tracks (commuter r	ft	6.4 dBA	60 dBA	58 dBA	63 dBA	None
15			4 Diesel Electric Locomotive	ft	6.4 dBA	60 dBA	58 dBA	63 dBA	None
16			5 --	ft		60 dBA	58 dBA	63 dBA	
17			6 --	ft		60 dBA	58 dBA	63 dBA	
18			Combined Sources		64 dBA	60 dBA	58 dBA	63 dBA	Severe Impact



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